虚拟现实情境下横穿马路行为研究

An investigation of road crossing in a virtual environment

Why do children fail to cross the road safely?

Two major deficiencies in young children's road crossing:

1. the selection of appropriate locations
2. the uptake and use of info about traffic flow

What ability needed for crossing the road?

What is the judgment of a proper gap for crossing the road?

1）perception of the oncoming traffic;

2）the action of walking across the road

1）Environmental and personal factors

2）The determination of the time-to-contact of the nearest vehicle with the planned crossing line

3）The assessment of whether the time-to-contact exceeds the time required to cross the road, taking into account one’s own locomotive speed

- So the crucial question is?

  the size of the gap (time-to-act)

  varies among

  locomotive speed

  &environmental factors

  (strong winds/rough road surface)

  &personal factors

  (fatigue/heavy luggage)

- Some re showed that errors come from children's failure to apply their perceptual-motor skills appropriately instead of an inability to make the required judgments accurately.

Can we pick up some ideas of getting to know the crossing road errors of children?

Difficulties we need to overcome:

- 1.methodologies and samples vary;
- 2.fail to control RC situations and their contributions to safe behavior;
- 3.risk of RC;
- 4.how to measure children's decisions independent of adults

- Passive-involved:
  - chalkboard
  - videotapes
  - table-top simulations
  - computer animations

- Methods with no actual road crossing involved:
  - the pretend road
  - two-step task
  - shout task

  lack of validities!

Method

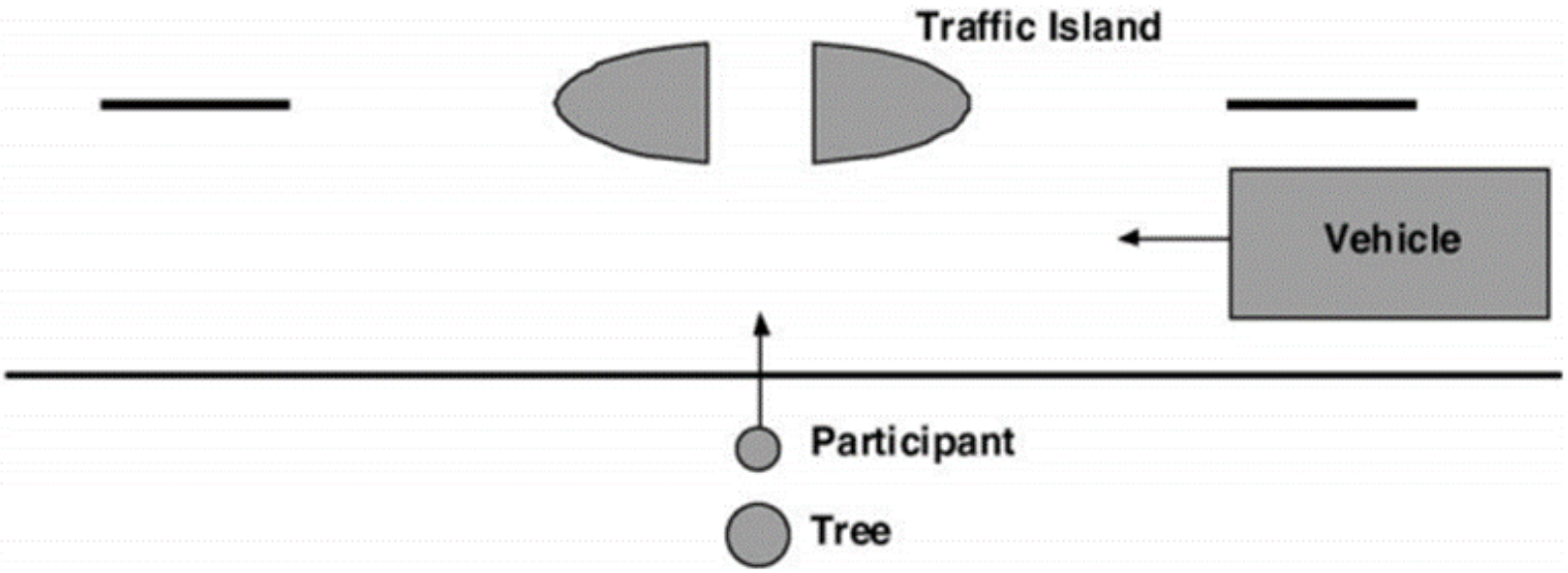
- Manipulated variables – the speed and inter-vehicle distance of the approaching traffic
- Speed(failing to take it into account) & Distance ⟹ make the right judgment of time-to-contact

- *Plus-a measure of judge whether the gap is no longer large enough to cross safely*

Method Design

- Participants: 4 Group(age) * 6/Group
- 14 trials (2 training T + 6*2 test T)
  - uniform speed: 40,50,60 km/h
  - uniform distance:65,75,85m
- Time gap is always constant, it can be either 4,6,8,10s

Design



- They were instructed that they could move around by walking and could look around by turning their head.
- Each trial was terminated when the participant had crossed the road to the center of the traffic island.

Design

- Collisions:
  - the proportion of being hit (available)
- Tight fits
  - the proportion of crossing road when the vehicle was less than 1.5s from colliding but did not result in collision
- Cautious crossing
  - the proportion of crossing road when participants waited until all ten vehicles passed
- Crossing time
  - The mean of the time gaps in which the participant crossed the road was calculated

Design

- Rejected gaps:
- Number of gaps:

- Descriptive info
- Sex-Age-Type ANOVA on these DV
- More see at reference(An investigation of road crossing in a virtual environment)

Results

- Overall performance was better in uniform speed than uniform distance trials, consistent with previous research suggesting that pedestrians base road crossing decisions on inter-vehicle distance rather than vehicle speed.
- The main result --- data analysis way (ANOVA)

Results

同等车速实验：

车速：	40km/h	间隔时间： 6	碰撞
车速：	40km/h	间隔时间： 8	通过
车速：	50km/h	间隔时间： 8	通过
车速：	50km/h	间隔时间： 4	通过
车速：	60km/h	间隔时间： 8	通过
车速：	60km/h	间隔时间： 4	碰撞

同等车距实验

车距：	65m	间隔时间： 4	碰撞
车距：	65m	间隔时间： 6	碰撞
车距：	75m	间隔时间： 8	通过
车距：	75m	间隔时间： 8	通过
车距：	85m	间隔时间： 8	碰撞
车距：	85m	间隔时间： 8	碰撞

Result Analysis BrainStorm

Try some new perspectives

- Regroup samples (e.g. collision rate in one of all same time gap)
- Consider about the program design(four conditions of time gaps:4s,6s,8s,10s; 10 cars?? how to allocate? If orderly, rejected gap ; If random, reference effect?)